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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,609	12/02/2005	Shinji Eritate	03500.103418	1529

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EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	**PAPER NUMBER**
1795	

MAIL DATE	DELIVERY MODE
12/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/559,609	ERITATE ET AL.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response

1. This Office Action is in response to the arguments filed September 29, 2007. Claims 1-6 are pending and are rejected for the reasons given below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand et al. (US 6,216,035) in view of Morishima et al. (US 21003/0129467).

Fuglevand et al. teach a proton exchange membrane fuel cell power system. Each fuel cell of the system comprises a pair of current collectors, an anode and a cathode, and a polymer membrane between the electrodes (abstract).

Fuglevand et al. teach that the membrane is a cross-linked polymeric chain containing sulfonic acid groups, and many of the examples disclosed include a methacrylate (column 18 lines 22-29). The methacrylate is considered to be the compound having proton conductivity, since, according to the instant specification, a compound having proton conductivity may be a polymethacrylic acid ([0042]). The instant specification also discloses that a compound having both proton conductivity and

activity to an active energy ray may be used, and examples of such a compound include ones having a sulfonic group ([0048]-[0049]).

Fuglevand et al. teach that the proton conducting electrolyte membrane is sandwiched between catalytic electrodes (column 4 lines 12-24). The electrodes preferable contain a platinum catalyst (column 10 lines 8-10).

As for claim 2, a support matrix, or reinforcement member, is taught by Fuglevand et al. (column 19 lines 39-40). Grafted polyethylene is provided as an example of the reinforcement member (column 19 lines 59-61). The instant specification discloses ethylene as a suitable material for the reinforcement layer ([0063]).

The method limitations and infiltrating limitations will now be addressed.

Fuglevand et al. teach that a mixture containing the membrane material (containing methacrylate) is applied to the support matrix, or reinforcement member. Then, the membrane is polymerized by UV light, an active energy ray (column 19 lines 59-61).

Fuglevand et al. fail to teach that the electrolyte is coated onto the membrane before it is polymerized.

Morishima et al. teach a membrane electrode assembly for fuel cells (abstract). Morishima et al. teach that the membrane electrode assembly may be made by various

different methods known in the art, including a method by which the electrolyte solution is coated onto the catalyst layer ([0049]).

One of ordinary skill in the art, knowing that this method may be used to form a membrane electrode assembly, might choose to use this method to from the assembly of Fuglevand et al., since such a method would make manufacturing easier because the membrane would be formed integrally to the catalyst layer, which would also provide a more reliable bond.

As for the "infiltrating" limitations of claims 1, 3 and 6, since the membrane of Fuglevand et al. in view of Morishima et al. is made by the same method, and using the same materials, as disclosed in the instant specification and claims, the resulting product would have the same properties, specifically, the property of the membrane infiltrating the electrode catalyst layer.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Morishima et al. to form the membrane electrode assembly of Fuglevand et al., since such a method would make manufacturing easier because the membrane would be formed integrally to the catalyst layer, which would also provide a more reliable bond.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuglevand et al. in view of Morishima et al. as applied to claim 3, and in further view of Akita et al. (US 6,523,699).

The teachings of Fuglevand et al. and Morishima et al. as discussed above are incorporated herein.

Fuglevand et al. in view of Morishima et al. teach a platinum catalyst on the electrodes of the membrane electrode assembly, but fail to teach the thickness of the catalyst layer.

Akita et al. teach a fuel cell having excellent catalytic activity (abstract).

Akita et al. further teach that the platinum catalyst should be 50-250 μm thick. According to Akita et al., for catalyst thicknesses less than 50 μm, there could be an insufficient amount of catalyst, and for thicknesses greater than 250 μm, the possibility of the catalyst surface becoming unstable arises (column 8 lines 31-44).

As for the limitation concerning the depth of infiltration into the electrode catalyst layer, the infiltration would necessarily be equal to or less then the thickness of the electrode catalyst layer, since it would be impossible for the membrane to infiltrate the electrode catalyst layer further than the thickness of the layer. Additionally, since the MEA of Fuglevand et al. in view of Morishima et al. is made by the same method of the instant invention, the infiltration depth would inherently meet this limitation.

It would be desirable to make the platinum catalyst of Fuglevand et al. in view of Morishima et al. 50-250 μm thick, encompassing most of the claimed range, since at

smaller thicknesses, there could be an insufficient amount of catalyst, while at larger thicknesses, the catalyst surface could become unstable.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the platinum catalyst of Fuglevand et al. in view of Morishima et al. 50-250 μm thick, since at smaller thicknesses, there could be an insufficient amount of catalyst, while at larger thicknesses, the catalyst surface could become unstable.

Response to Arguments

5. Applicant's arguments, with respect to the rejections of claims 1-3, 5 and 6 under Fuglevand et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made, see above.

Specifically, the examiner was mistaken in alleging that the electrolyte of Fuglevand et al. was coated on the catalyst layer prior to polymerization.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1795

aee

Susy Tsang-Foster

SUSY TSANG-FOSTER
SUPERVISORY PATENT EXAMINER